DESTROYER ESCORT
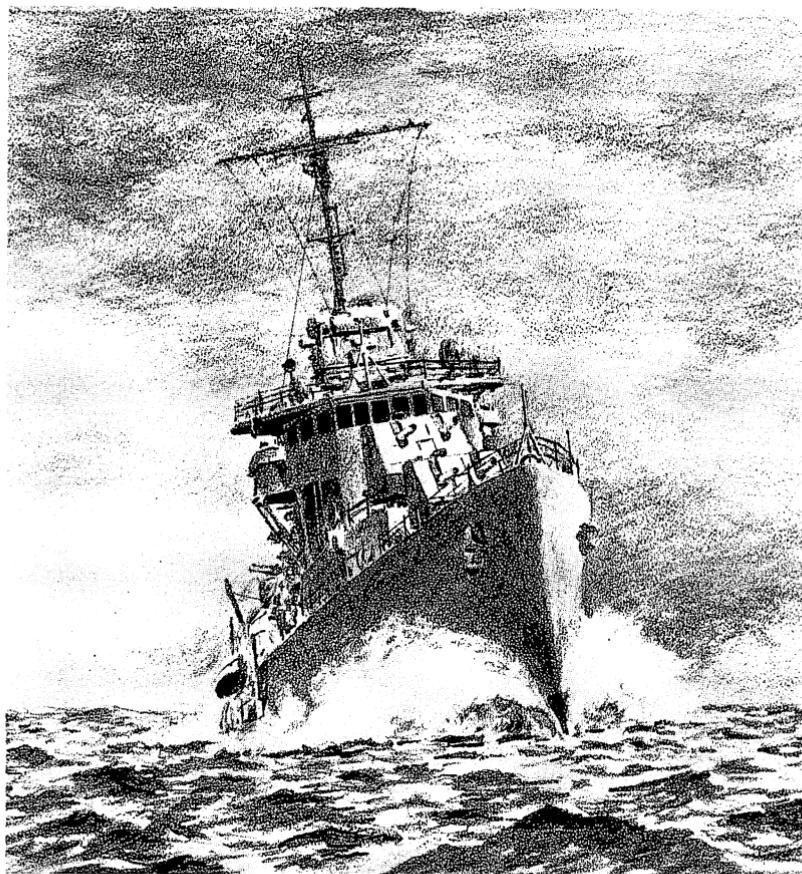
WWII NAVAL
ACTION IN THE
NORTH ATLANTIC

MICROPLAY™
SOFTWARE

DESTROYER ESCORT™

Convoy Destroyer Escort
Combat Operations

Destroyer Escort™

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INTRODUCTION

DESTROYER ESCORT is a World War II naval simulation of convoy escort missions in the Atlantic. It places you into the role of a convoy escort captain and presents you with the same information, problems, and resources available to an actual destroyer captain. Included are six different convoy missions and three levels of play difficulty. Detailed battle station screens, solid 3-D ships, realistic graphics, and sound effects combine to provide the dramatic experience of commanding a destroyer on convoy escort duty.

The destroyer escort played a crucial role in the defense of the Atlantic convoys and the defeat of the U-boat menace. The convoy routes had to be kept open, first to keep Britain in the war, and later to build up the strength necessary to return Allied troops to the European mainland. The German U-boats, plus surface raiders and aircraft, threatened to strangle Britain and the Allied effort in Europe. Destroyer escorts were the main weapon of defense for the sea lanes, shielding and shepherding their convoys through the gauntlet of sea and air attacks.

As a DESTROYER ESCORT captain you are evaluated according to the number of convoy ships that successfully reach port, the number of enemy subs, ships, and planes you destroy, and the survival of your ship. With limited amounts of fuel and ammunition, you must wisely spend your resources and maneuver your ship to maximize its effectiveness. Outstanding performances are rewarded with decorations.

Experienced game players and those wishing to start quickly need not read the entire manual before playing DESTROYER ESCORT. It is suggested that all new players read at least the sections "A Quick Start," "Your First Mission," "Bridge Station," "Map Station," "Navigation Station," and review the technical insert sheet. This should be enough information to get you playing. You can refer to other specific sections of the manual when relevant situations arise. In addition, your enjoyment of this simulation will be enhanced by an understanding of the history, equipment, and tactics of the convoy battles of the naval war in the Atlantic, described in Part II.

A QUICK START

What's Where

The Manual: This manual is divided into three sections for convenient use. Part I gives specific instructions for all game displays and controls. Part II provides an historical background and Part III includes player's notes offering comments on game tactics.

For your first mission, you'll want to refer frequently to Part I of this manual, pages 8-26. This explains each display, and how to operate your destroyer in battle.

The **Technical Supplement:** Due to the differences in various computer models, the specific keys and other *controllers* used in DESTROYER ESCORT will vary. All terms printed in *italics* in this manual are defined in the Technical Supplement. Refer to it whenever you need to find a specific control.

Which Mission?: We strongly recommend that you try a learning game set at an easy level of difficulty before you tackle DE-STROYER ESCORT at the higher difficulty levels.

Learning Games

In your first game, we suggest the following selections:
Mission: America to Britain
Expected Enemy Resistance: Below average

Getting Started: After a brief introduction, you'll find yourself at the bridge station of your destroyer. Find your *controller* (mouse [6800 machines only], joystick, or cursor keys) and *selector* (fire button, mouse button, or the Return key) and use them to access the other battle stations of your ship. Find the *pause key* (check the Technical Supplement) and use it frequently as you learn.

Experiment at the Battle Stations: Try the controls at each station for maneuvering the ship or firing the weaponry.

Finding the Enemy: Don't worry, he'll find you. If you get impatient, go to the bridge station where you can generate an attack of your choice (see Automatic Attacks, page 10).

Sail Toward Him: Once you locate the enemy, move toward him. Try the navigation controls, referring to page 13 in the manual for more details.

Fire Weapons: Now try firing weapons at the enemy. If you're facing a ship or sub on the surface, the 5" gun is suggested. Make sure you're sailing straight at the enemy before firing. Read the 5" gun controls explanation on pages 16-17. If under air attack read the AA gun controls explanation on pages 18-19. If you are fighting a submerged sub read the depth charge controls explanation on pages 19-20. Ignore your own torpedoes for now.

Further Training: Try a learning game a few more times. Experiment against all three types of attacks (submarine, ship and aircraft). Also experiment with evading enemy torpedoes.

Advanced Missions

Once you've cut your teeth on some learning games, it's time to play for keeps. Begin playing at average difficulty. Try the game missions in order, one after the other, and attempt to successfully complete them all. Try to top your previous high score. Keep in mind your ability to generate the attack of your choice when you wish. This can help you score points, but does increase your risk.
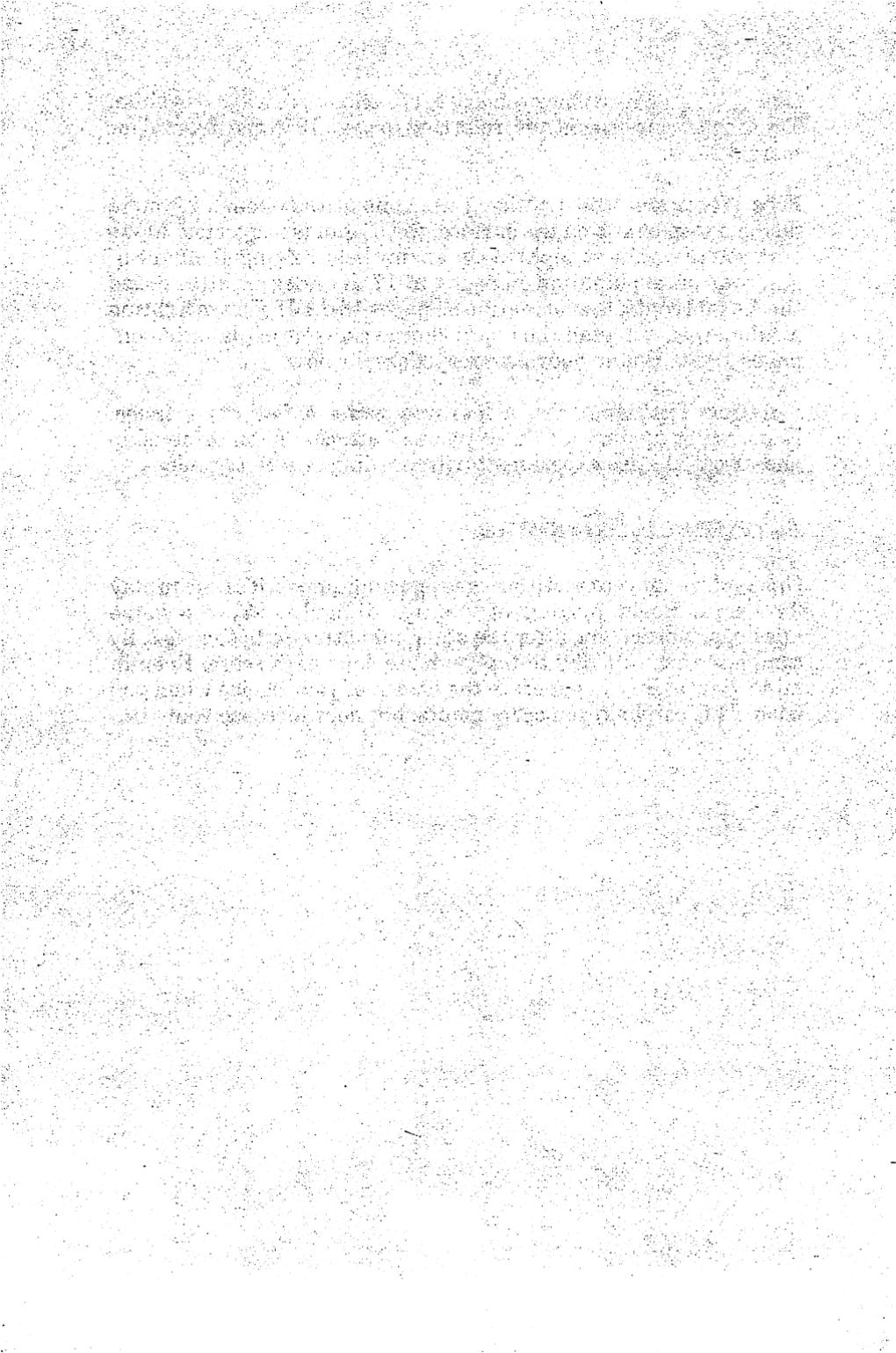
PART I: DESTROYER ESCORT CONVOY DUTY
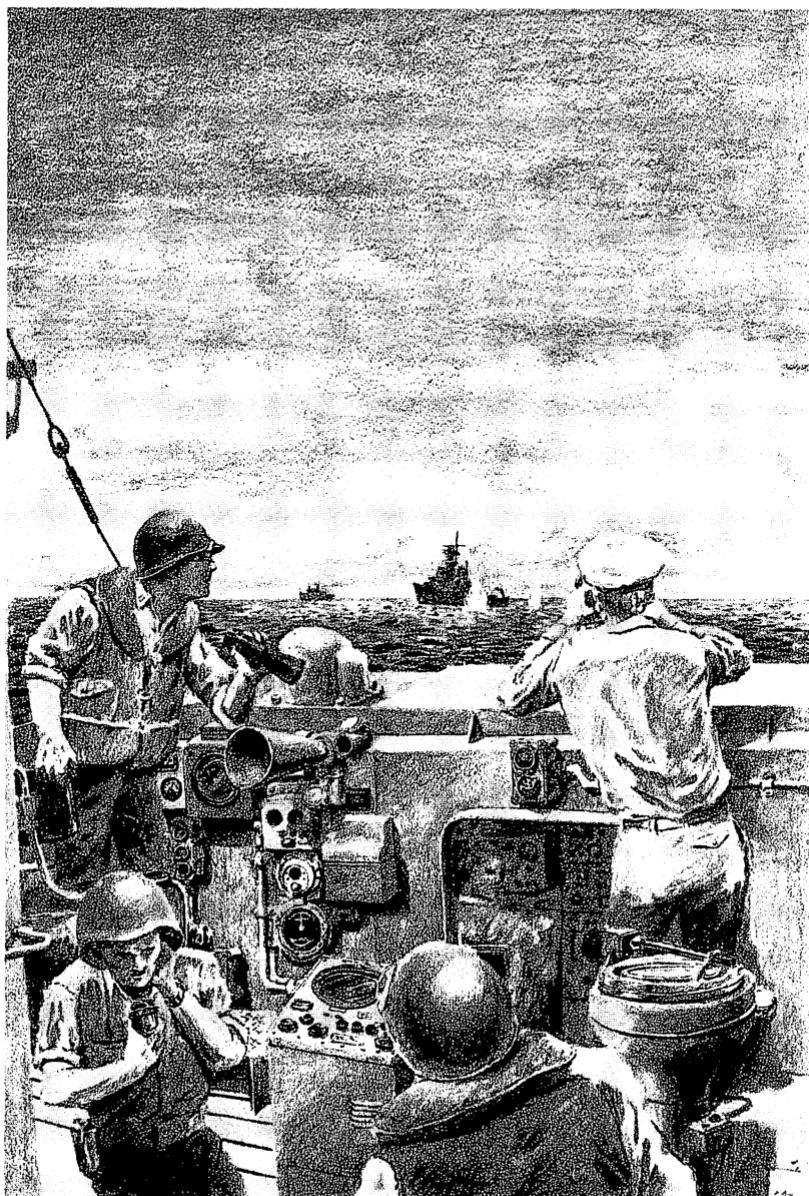
Your First Mission

Convoy Assignment: When DESTROYER ESCORT is loaded a teletype appears. This is a menu that enables you to choose one of six different convoy missions to play:

1. America to Britain
2. Britain to Gibraltar
3. Murmansk to Britain
4. Britain to America
5. Gibraltar to Britain
6. Britain to Murmansk

Type the number of the mission you want to play.

Expected Enemy Resistance: After you have selected your mission, select the level of enemy resistance expected:

1. Below average
2. Average
3. Above average

Type the number for the level of resistance you wish. The higher the level selected, the more difficult your mission. As more enemy attacks occur, it's harder to hit the enemy and easier to be hit yourself. In addition, you start with less ammunition and it is easier to sink your destroyer.

Reset Option: After you have selected the expected level of resistance, you have a chance to reselect your play options. If you are happy with your choices press the *Yes* key to begin play. If you wish to reselect your play options press the *No* key and make new choices.

Teletype Default Key: Refer to the Technical Insert for the *Teletype Default* key. Use this key to skip the remainder of the teletype report and start the game. If you press this key before making any choices you automatically receive the "America to Britain" mission at average difficulty. If you press this key after selecting your mission, you get the selected mission and the difficulty is "average." If you press the key after selecting both your mission and difficulty, you proceed to the game immediately.

Bridge Station

Damage Report Station — Map Station — 5" Gun Mount — AA Gun Station — Navigation Station — Depth Charge Station — Ship's Status Station — Torpedo Launcher
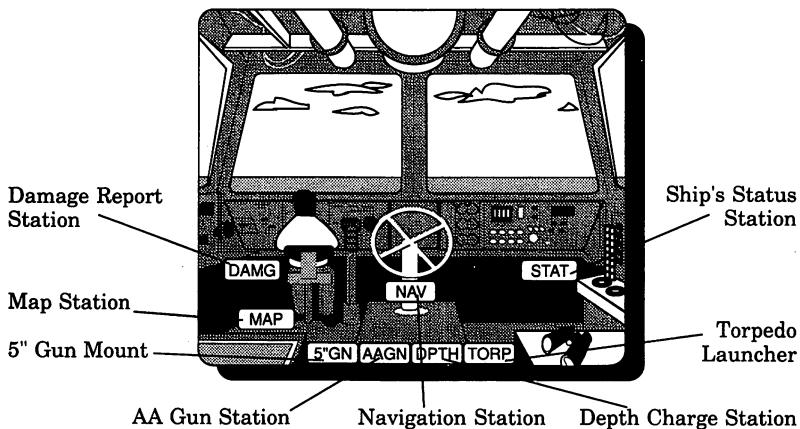
Reaching the Bridge Station: When play begins you are at the bridge station, your command post. From any other battle station you can reach the bridge station by pressing the *Bridge* key.

Description: From here you may select any of the eight detailed battle stations: navigation, map, damage, status, 5" gun, AA gun, depth charges, and torpedo. Use the *controller* to move the *pointer* onto the icon of the station you wish to go to. When the pointer is on the icon, the name highlights. Press the *selector* when the name is highlighted to switch to the selected station.

Quitting the Game: You must be at the bridge station to quit the game. To quit press the *Quit Game* key. You will return to the teletype and can start over.

Automatic Attacks: In addition to the normal attacks your convoy undergoes in a DESTROYER ESCORT mission, at your option you may automatically generate sub, ship, and air attacks. This ability allows you to practice one aspect of the game or attempt to push up your score. To call up an automatic attack you must be at the bridge station and not currently under attack. Press the *Air Attack*, *Sub Attack*, or *Ship Attack* key as desired.

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Map Station

Ship Icon

Destination

Convoy

Destroyer
Escort

Plane Icon

| H | W | D | 00 | T | 0004 | CONVOY AT DESTIN |

Convoy Heading   Days Passed   Time of Current Day   Message Window
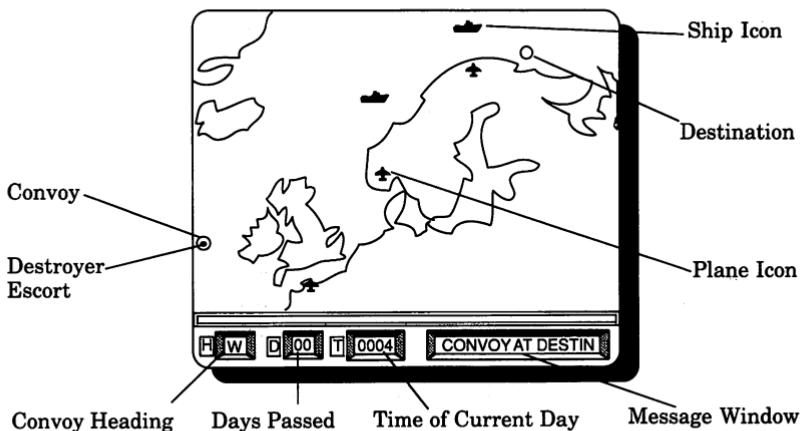
Reaching the Map Station: Selecting the "MAP" icon on the bridge or pressing the *Map* key moves you to the map station.

Description: The top part of the map station shows the theater of operation for your convoy mission. There are two possible maps: the Norwegian Sea (for all missions to and from Murmansk) and the North Atlantic (for all other missions). Visible on the map are land and sea areas, your convoy, your destroyer, the convoy's destination, and hot spots of enemy activity.

Information Windows: The bottom of the map station shows four information windows. The first window, labeled "H", reports the current heading of your destroyer and your convoy. This is the direction you are steaming in degrees of the compass. It can be one of eight directions:

N (North)	000 degrees
NE (Northeast)	045 degrees
E (East)	090 degrees
SE (Southeast)	135 degrees
S (South)	180 degrees
SW (Southwest)	225 degrees
W (West)	270 degrees
NW (Northwest)	315 degrees

The next two windows, labled "D" and "T", report the number of days ("D") that have passed since the mission began and the time ("T") in hours of the current day. The fourth window is for messages and reports.

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Destroyer and Convoy Movement: To move the convoy push the *controller* in the direction you wish to travel. Your destroyer remains in its position relative to the convoy and moves with it. Your destroyer can be moved independently from the convoy by holding down the *selector* and then pushing the *controller* in the direction you wish the ship to move.

Time does not pass and neither your destroyer nor the convoy move unless you push the controller. To complete your mission you must move the convoy onto its destination. When you reach the destination a message appears confirming your arrival.

Enemy Attacks: When an attack against your convoy begins, the general quarters gong sounds and a message appears describing the threat. If you are under attack by a U-boat or enemy ship, the message reports which one (of eight) directions the enemy is coming from. Once the gong begins ringing, movement on the map is no longer possible. The game pauses except when you are under air attack. If an air attack has begun and you are not at the AA gun station, you automatically accumulate damage. The game resumes when you go to one of the battle stations to deal with the threat. The general quarters gong continues to ring until you go to an appropriate battle station to deal with the threat.

While still at the map screen it is possible to use the *controller* to change the heading of your convoy and steer it away from an attacking sub or ship. Air attacks cannot be evaded.

Enemy Threat Icons: The closer your convoy approaches the enemy ship and airplane icons, the greater the chance of enemy ship or plane attacks. There is no sub icon: sub attacks can occur anywhere at sea.

Leaving the Map Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station.

Navigation Station

Compass

Steering
Hot Spots

Turn Indicator
Lights

Convoy

Plotting Board

Destroyer
Escort

Ship Heading

Target
Bearing

Target Range

Target
Identification

Message
Window

Plotting Board   Engine Telegraph   Ship Speed   Speaker Tube
Zoom Indicator
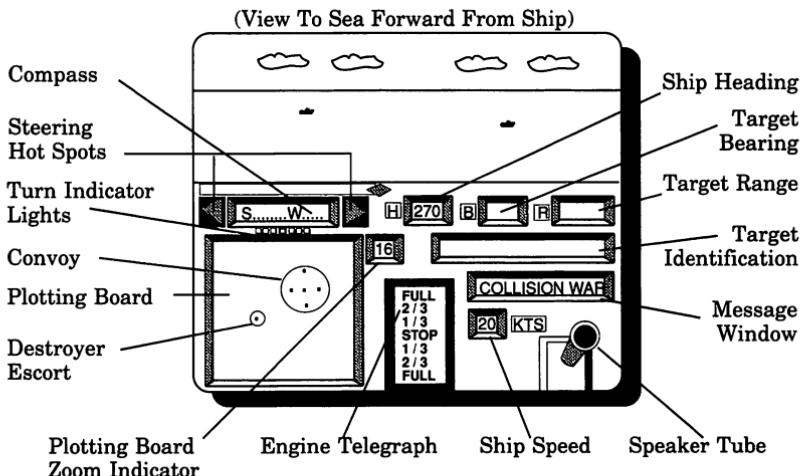
Reaching the Navigation Station: Selecting the "NAV" icon on the bridge or pressing the *Navigation* key moves you to the navigation station.

Navigation Controls Description: Your ship's speed is controlled by the engine telegraph and shown by the speed indicator. The ship heading window and compass show the direction your ship is sailing. To the right and left of the compass are the colored triangles that are the steering "hot spots." You trigger these hot spots to make turns (see below). The turn indicator shows which direction you are turning and how sharp the turn. This indicator consists of seven lights below the compass, only one of which is lit at a time. When the center light is on you are steering amidships and not turning. The further the light is to the left or right of center, the sharper your turn.

Destroyer Speed: To adjust your destroyer's speed, use the *controller* to move the *pointer* onto the engine telegraph. "Grab" the telegraph handle by placing the *pointer* between the two red marks. Now hold down the *selector* and push the *controller* forward (to increase speed) or back (to decrease speed). Your ship's new speed, in knots, appears on the speed indicator.

Destroyer Steering: Your ship's heading or course can be controlled by using the *controller* to trigger the steering "hot spots." Your current heading in degrees is shown in the destroyer heading window. You can change your heading only by turning to the left,

to the right, or steering amidships (straightening the rudder if you are already turning).

To begin a turn, place the pointer onto the steering hot spot to the side of the compass towards which you wish to turn. Tap the *selector* to move the indicator light one position. Hold the *selector* down to move the light out to the furthest position. As you turn, the compass and heading indicator change to reflect your changing course. To straighten out your ship either bring the indicator light back to the center by triggering the opposite hot spot, or place the *pointer* in the center of the compass itself and press the *selector*.

The destroyer does not change to its new turn rate immediately; it takes time to reach the turn you've selected. Remember to factor momentum into your calculations when bringing your ship around to a new heading; begin to straighten out before the heading indicator reaches your intended new course.

Plotting Board Description: The plotting board represents a combination of sonar and radar reports from the vicinity of your ship. It shows the position of your ship relative to the convoy and any enemy ships, subs, or torpedoes present . Your ship is always the dot or icon in the center of the plotting board. The diamond pattern of dots are the five ships in your convoy. Any other dots are enemies or torpedoes. Next to the top right corner of the plotting board is the plotting board zoom indicator. The number in this window indicates the scale of your radar/sonar sweep ranging from 1 to 64, with 64 being the highest magnification.

Plotting Board Zoom Controls: To change the scale of the plotting board, move the *pointer* into the zoom window. Hold down the *selector* and push the *controller* either forward to zoom or backward to unzoom.

Ship Identification: To identify a ship on the plotting board, move the *pointer* on top of its dot and press the *selector*. The ship's type appears in the target identification window. The bearing and range of the target appear in the target bearing and range indicator windows. The bearing is shown in degrees from 000 (due North) clockwise to 359 (one degree west of due North). The range is the distance in yards from your ship to the enemy along the bearing. As long as a ship remains identified its dot or icon blinks on the plotting board. A ship becomes unidentified only if you identify another ship or move the pointer to a vacant area on the plotting board and press the selector. If you go to the 5" gun,

torpedo, or depth charge stations, the identified ship's bearing and range information is transferred to those stations, which will be very useful to you.

Leaving the Navigation Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station. Alternatively, use the controller to move the *pointer* onto the speaker tube and press the *selector* to go to the bridge station.

Battle Station Ship Controls
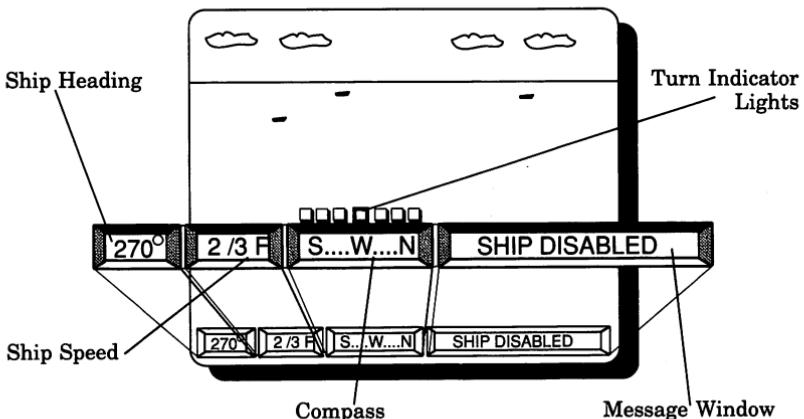
Description: At the 5" gun, AA gun, torpedo, depth charge, damage, and status stations you can control the heading and speed of your destroyer using keyboard controls. The *controller* and *selector* cannot be used for this purpose. (They usually do something else at these stations.) These stations display the same set of windows shown in the diagram above. The compass, turn indicator lights, ship heading indicator, and ship speed indicator work in the same manner as they do at the navigation station.

Destroyer Speed: To change the ship's speed, tap the + *Speed* key (to increase speed) or the- *Speed* key (to decrease speed). (Refer to the Technical Supplement for the appropriate key.) As you make a change your ship's new speed gradually appears on the speed indicator.

Destroyer Steering: To change the ship's heading, tap the *Starboard Turn* key (to turn to the right) or the *Port Turn* key (to turn to the left). (Refer to the Technical Supplement for the

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appropriate key.) On each key tap, the turn indicator light moves one step in that direction. The further to the right or left the light, the sharper the turn. As you turn, the heading indicator and compass change to your new heading.

You can straighten out your turn in two ways. First, you can tap the turn key in the opposite direction to bring the indicator light back to the center of the compass. Second, you can press the *Amidships* key. In either case your ship gradually stops turning and stabilizes onto a steady course.

5 Inch Gun Mounts
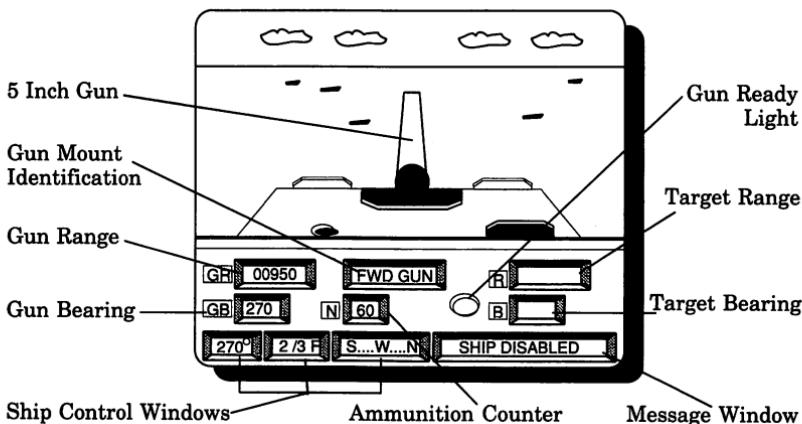
Reaching the 5" Gun Mounts: Selecting the "5"GN" icon on the bridge or pressing the *5" Gun* key moves you to the forward 5" gun mount. Press the *Starboard/Aft* key to move to the aft 5" gun mount instead.

Description: The forward (bow) mount covers a 180° arc in front of your ship; the aft (stern) mount covers a similar arc to the ship's rear. Between them they cover a complete circle around your ship. The windows in the bottom half of the station display the information necessary to fire the gun at enemy ships and subs on the surface. The ship control windows make it possible to control your destroyer from this station (refer to the section on battle station ship controls).

Gun Controls: The 5" gun is aimed with the *controller*. Push the *controller* left or right to traverse the gun left or right. As it swings, the gun bearing indicator changes to show the gun's new direction.

To elevate or depress the gun, pull back or push forward on the *controller*. The gun range indicator increases as the gun is elevated and decreases as the gun is depressed. The gun range is the distance a shell travels when fired.

To fire, press the *selector* . The gun ready light must be "ready" to fire. The gun cannot be fired when the ready light is "not ready." (Refer to the Technical Supplement for the appropriate color of "ready" and "not ready" lights.) The ammunition counter shows how many shells are left. You can't fire if you're out of ammo.

A white shell splash indicates a miss. A grey splash and flash on the horizon indicate a hit. Four hits disable a target: it can no longer fire weapons or move. Six hits sink it.

Tactics: It's wise to identify the target on the plotting board (at the navigation station) before going to the 5" gun station. This way the target's range and bearing information appear at the gun mount. Then match the bearing and range of the gun to the range and bearing of the target and fire. If the target is not moving your shells usually hit. However, moving targets are harder to hit. By the time your shell arrives the target has changed its range or heading, or both.

The easiest way to hit a moving target is to head directly towards or away from it. The bearing of the gun on the target then stays relatively constant and needs only minor adjustments. This allows you to concentrate on adjusting your gun's range to compensate for the target's movement. If the target is approaching, fire less than the current range. Fire over the target if the target is sailing away. You must estimate where the target will be when your shells arrive, then fire at that distance.

Leaving the Gun Mounts: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station.

Anti-Aircraft Gun Station

AA Gun

Gun
Temperature
Gauge

Ammunition Bin

270° | 2/3 F | S....W....N | SHIP DISABLED

Ship Control Windows

Message Window
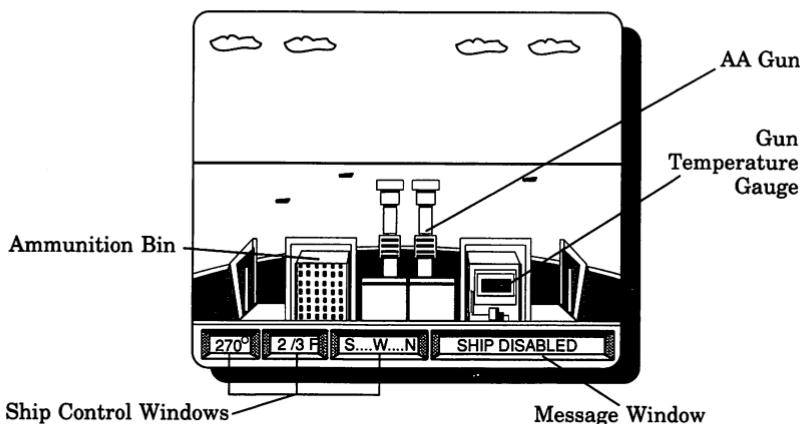
Reaching the AA Guns: Selecting the "AAGN" icon on the bridge or pressing the *AA Gun* key moves you to the AA gun mount.

Description: The AA station looks at the ocean on the left side of your ship. The readiness of your gun to fire is indicated on the gun mount itself. The ship control windows make it possible to control your destroyer from this station (refer to the section on battle station ship controls). When under air attack a wave of nine airplanes is visible in the distance above the horizon. When the ninth plane either passes over your ship or is destroyed, the air attack ends.

Gun Controls: Use the *controller* to swivel, raise, and lower the AA gun, as with the 5" gun. Press the *selector* to fire the gun. Although your ship carries a virtually unlimited supply of AA ammunition, you can fire it off faster than the gun can be reloaded. Each time you shoot, the ammo bin drops one shell. When you stop shooting more ammo is brought up to refill the bin. If you fire continuously it's possible to empty the bin. You cannot fire if the bin is empty: you must wait until at least one shell is replaced.

The color of the gun temperature gauge shows whether the gun is cool and ready to fire, overheating and only able to fire at a reduced rate, or hot and unable to fire. As you fire the gun it heats up and the gauge color changes from cool to overheating to hot. When you stop shooting, the gun cools. Refer to the Technical Supplement for the gun temperature gauge colors.

Hitting Planes: To destroy an enemy plane, fire your gun so that either the shells intercept the plane, or the shell explodes on the aircraft. At long range a single shell burst can knock down an aircraft. Once a plane begins its attack run, it must be hit multiple times (on average four times) to be destroyed. When a shell hits, the screen flashes red. Planes that are seriously damaged (but not destroyed) may not attack. They appear burning as they pass over. When a plane fires at you, the screen shakes as its shells strike your ship.

Leaving the AA Gun Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station.

Depth Charge Station

K Gun

Roll off Racks

Depth Charge Counter

K Gun

Fuse Setting

Target Range

Intercom

Target Bearing

270°   2/3 F   S....W....N   SUBMARINE SUNK

Ship Control Windows   Depth Charge Ready Lights   Message Window
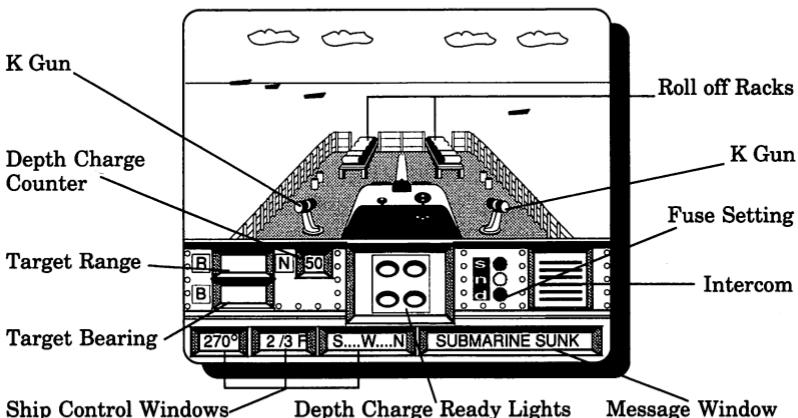
Reaching the Depth Charge Station: Selecting the "DPTH" icon on the bridge or pressing the *Depth Charge* key moves you to the depth charge station.

Description: At the depth charge station you face aft, looking off the stern of your ship. Nearest the stern are two ready racks containing depth charges you can drop behind you. To the sides of the gun turret are two "K" guns for launching depth charges to the side. (The gun turret is the aft 5" gun, but it's controlled from a separate station, not here.)

The windows labled R and B report the range and bearing of the target. The window labled N reports the number of depth charges remaining on your ship. The depth charge ready lights show when

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the stern racks and "K" guns are ready to fire. The fuse settings report the depth where the charges will explode, either shallow (S), medium (M), or deep (D). The ship control windows make it possible to control your destroyer from this station.

Depth Charge Controls: Each ready light corresponds to one of the four depth charge launchers: the two stern racks and the two "K" guns. The color of the ready light shows whether the launcher is ready to fire or not. When a light is ready, place the *pointer* on it and press the *selector* to launch that depth charge. When the light is not ready the charge cannot be fired. The light on the fuse setting marks the depth where the charges are set to go off. To change the fuse setting move the *pointer* to the desired setting and press the *selector*. The light changes to the new setting.

Depth Charge Attacks: To successfully kill a submarine underwater you must explode charges at its position and depth. Watch your depth charge explosions for telltale black oil slicks indicating a hit. It can take up to three hits to sink a sub.

Steer your ship directly at the sub so as to pass over it. As the range decreases to 100 yards or less, drop a spread of depth charges. You must guess the depth to set the charges, but subs under attack go deep more often than they stay shallow.

Ship Controls: Refer to the section on battle station ship controls, page 15, for instructions on changing your ship's speed and heading while at the depth charge station. This can be very important in depth charge attacks, as the sub may attempt to change position to avoid your attack. You can't afford to go the navigation station to control your ship because you need to be ready to drop your charges the moment you reach a favorable attack position.

Leaving the Depth Charge Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station. Alternatively, use the *controller* to move the *pointer* onto the intercom and press the *selector* to go to the bridge station.

Torpedo Launchers

Aiming Reticle

Torpedo Launcher

Torpedo Bearing

Torpedo Counter

Target Range

| TB | 180 |

| N | 30 |

Target Bearing

| B | |

| PORT TUBE |

Ready Lights

| 270° | 2 /3 F | S....W....N | SHIP ATTACKING |

Ship Control Windows   Launcher Identification   Message Window
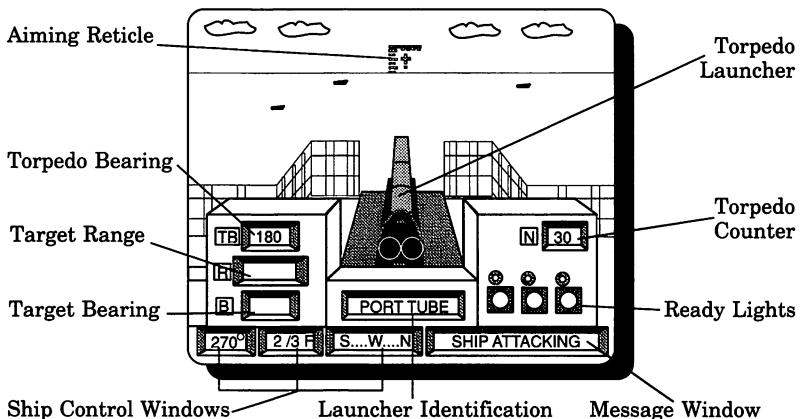
Reaching the Torpedo Launchers: Selecting the "TORP" icon on the bridge or pressing the *Torpedo* key moves you to the port torpedo station. Press the *Starboard/Aft* key to move to the starboard launcher instead.

Description: The port launcher is on the left side of the ship, the starboard launcher is on the right. The target bearing and range indicators report the bearing and range of a target previously identified at the navigation station. If a target was not previously identified, these windows are empty. The torpedo bearing indicator reports the direction the launcher is aimed. The ready lights report which tubes are ready to fire. The torpedo counter shows how many torpedoes remain on your ship. The ship control windows make it possible to control your destroyer from this station (refer to the section on battle station ship controls, page 15).

Torpedo Controls: The torpedo launcher is aimed with the *controller*. Push the *controller* to the left or right to traverse the launcher and aiming reticle. The torpedo bearing changes as the launcher is traversed. A fully loaded launcher has three torpedoes ready to fire, as indicated by three ready lights showing "loaded." At least one light must show "loaded" to fire. Refer to the Technical Supplement for descriptions of "loaded" and "unloaded" colors.

Press the *selector* to launch a torpedo. When a torpedo is launched the first ready light from the right turns to "unloaded" and stays that way until the torpedo strikes a target or runs out of fuel. At

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that point the "loaded" light comes on again to indicate that tube is reloaded.

Firing Torpedoes: Because torpedoes are launched from the side of your ship, you must sail on a heading somewhat perpendicular to your target, not directly towards him or directly away. Aim your torpedoes by lining up the aiming reticle with the target, or by matching the torpedo bearing and the target bearing. In either case, if the target is moving and its bearing is changing, you must "lead" it to compensate for its movement. How much to lead depends on the target's range and angle of approach. The longer the range or the wider the angle of approach, the greater adjustment needed because the target's bearing will change more. The shorter the range or the more narrow the angle of approach, the less adjustment needed. With the target information you have, you must guess where the target will be when your torpedo reaches it, and fire your torpedo in that direction.

A torpedo travels 2500 yards before it runs out of fuel. Don't fire at a target beyond that range unless you estimate the target will be within 2500 yards when the torpedo reaches it.

When you have the target lined up, fire one or more torpedoes. Shift the aiming reticle slightly in the direction of your lead for each successive shot to increase your chance of a hit. Because torpedoes move much slower than shells, hitting targets with them takes practice.

Leaving the Torpedo Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station.

Damage Report Station

Ship Overhead View

Damage Report Windows

Damage Report Scroll Knob

Speaker Tube

| P AA GUN 00 M |
| S AA GUN 00 M |
| SONAR   00 M |

| 270° | 2 /3 F | S....W....N | SONAR DAMAGED |

Ship Control Window   Damage Report Scroll Knob   Message Window
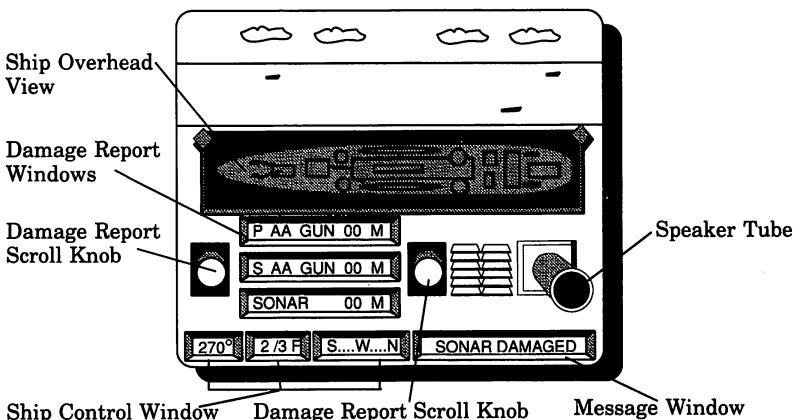
Reaching the Damage Station: Selecting the "DAMG" icon on the bridge or pressing the *Damage* key moves you to the damage station.

Description: Your ship can be damaged by gunfire, torpedoes, aircraft attacks, collisions, and running aground. There are two types of ship damage: repairable damage to ship equipment and irrepairable structural damage.

The damage station reports repairable damage to ship equipment and shows how much time is needed to make repairs. Damaged areas are highlighted in red on the ship's overhead view and reported in the damage report windows. The numbers to the right of the ship section name in the window are the game minutes needed to repair that damage. You can scroll through the list of ship sections by placing the p*ointer* on either of the knobs beside the windows and pressing the *selector*. The left knob scrolls down and the right knob scrolls up.

The ship control windows make it possible to control your destroyer from this station.

Damage Repair: Damaged sections of your ship are automatically repaired by your damage control crews. The time amounts in the damage report windows drop as the crews do their work. When the number reaches zero (0) the damaged section is repaired and functional again. Since time passes faster on the map screen, go to
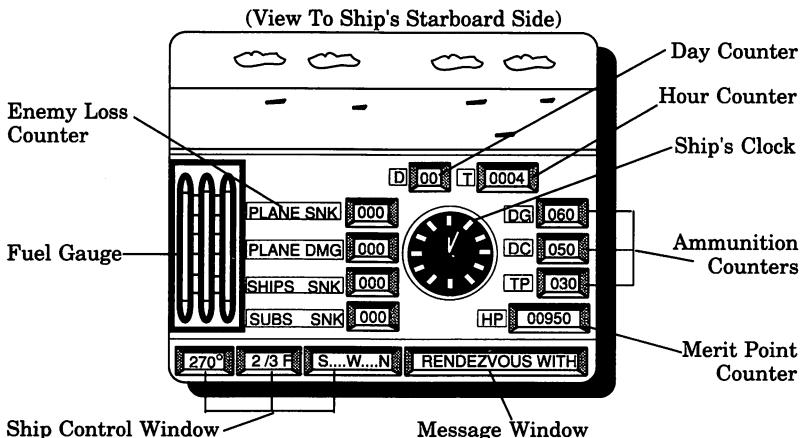
this screen to quickly repair all damage. However, during battle you cannot move on the map, so repairs cannot be speeded up.

Hidden Structural Damage: Whenever your ship is damaged it takes hidden structural damage. This is not shown because it cannot be repaired. Structural damage accumulates and will eventually cause your ship to sink. When this happens a message appears telling you to abandon ship. Your mission and the game are over.

Fuel Tank Leaks: Collisions or torpedo hits can cause a special type of severe hull damage. This damage causes your fuel consumption to double and penalizes you 500 merit points. It cannot be repaired.

Leaving the Damage Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station. Alternatively, use the *controller* to move the *pointer* onto the speaker tube and press the *selector* to go to the bridge station.

Ship's Status Station
(View To Ship's Starboard Side)

Day Counter
Hour Counter
Enemy Loss Counter
Ship's Clock
D 00 T 0004
PLANE SNK 000
DG 060
Ammunition Counters
Fuel Gauge
PLANE DMG 000
DC 050
SHIPS SNK 000
TP 030
SUBS SNK 000
HP 00950
Merit Point Counter
270° 2/3 F S....W....N RENDEZVOUS WITH
Ship Control Window
Message Window

Reaching the Status Station: Selecting the "STAT" icon on the bridge or pressing the *Status* key moves you to the status station.

Description: The ship's status station looks out from the right side of the ship. At this station you can determine the remaining

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amounts of various supplies and see how you are doing against the enemy. The fuel gauge shows how much fuel you have remaining. As you consume fuel the colored bars decrease and disappear, starting from the right hand bar. When the bars are gone you are out of fuel and can no longer move. The enemy loss counters show how many of each enemy unit type you have damaged or destroyed. The merit point counter shows how many points you have scored on the mission so far. The DG (5" gun), DC (depth charges), and TP (torpedoes) counters show how much ammunition you have left.

The ship's clock, the day counter, and the hour counter show the time elapsed on your mission.

The ship control windows make it possible to control your destroyer from this station.

Leaving the Ship's Status Station: Press the *Bridge* key to go to the bridge station, or press the appropriate key to skip the bridge and go directly to another battle station.

Resupply at Sea

If you are running out of fuel, 5" gun shells, depth charges, or torpedoes, you may replenish these stores by resupplying at sea. The ship in the center of your convoy is your supply ship. If it is sunk, resupply is impossible and your mission may be doomed.

Procedure: To resupply at sea manuever your destroyer onto a course parallel to the supply ship at a distance of between 100 and 150 yards away from it. It helps to approach the port side of the supply ship. Then go to the ship's status station and watch the supply ship's position as you take on stores. A message appears when the rendezvous is accomplished and resupply is taking place. The convoy moves at a constant speed slightly faster than your destroyer's 1/3 ahead speed but slower than your 2/3 ahead speed. During resupply you may have to adjust your speed to maintain contact with the supply ship. The time needed to resupply depends on how much fuel you need to take on. Check the ship's status station as you resupply. When the fuel gauge bars are all colored, resupply is completed.

Warning: Be careful to not get too close when resupplying. A collision sinks the supply ship and gives your destroyer hull damage.

Mission Debriefing

Completing the Mission: A mission ends in one of three ways: 1) all five ships in your convoy are sunk; 2) the remaining ships in your convoy reach their destination; or 3) your destroyer is sunk. When one of these events occurs, the game ends and you are sent to the teletype for a mission summary. The teletype reports whether you were demoted, how many merit points you scored for the mission, and whether you won any decorations. If your merit point score is high enough, your name is entered on the performance chart at naval headquarters.

Merit Points: Your ability as a destroyer escort captain is measured by the number of merit points accumulated during the course of your mission. You begin each mission with 950 points representing the value of your convoy and destroyer. Additional points are earned for destroying enemy units and the safe arrival of the convoy ships. Points are lost when convoy ships are sunk and your destroyer is damaged. The merit point values for actions are:

Plane downed	+50 mp
Plane damaged	+25 mp
Enemy ship sunk	+150 mp
Sub sunk	+200 mp
Cargo ship sunk	-150 mp
Merchant ship sunk	-200 mp
Supply ship sunk	-250 mp
Destroyer hull damage	-500 mp
Convoy ship safe arrival	+100 mp

Rank and Decorations: You begin each mission with the rank of captain. If you fail in your mission by losing either your destroyer or your entire convoy, you are reduced to the rank of ensign. If your destroyer and at least one convoy ship reach your destination you receive the Navy Cross. If you score at least 3500 merit points and all five convoy ships reach their destination, you receive the Navy Medal of Honor.

Naval Headquarters: If the merit point score for a completed mission is sufficiently high, it can be added to the list of top ten mission scores on your disk. After the teletype summary of a mission, press any key to go to naval headquarters where high scores are logged on the performance chart. If your score makes the chart, you are asked to enter your name next to the score. When you are finished at naval headquarters, press the *Exit* key to play again.

PART II: DESTROYER ESCORT DUTY IN THE ATLANTIC 1939-1945
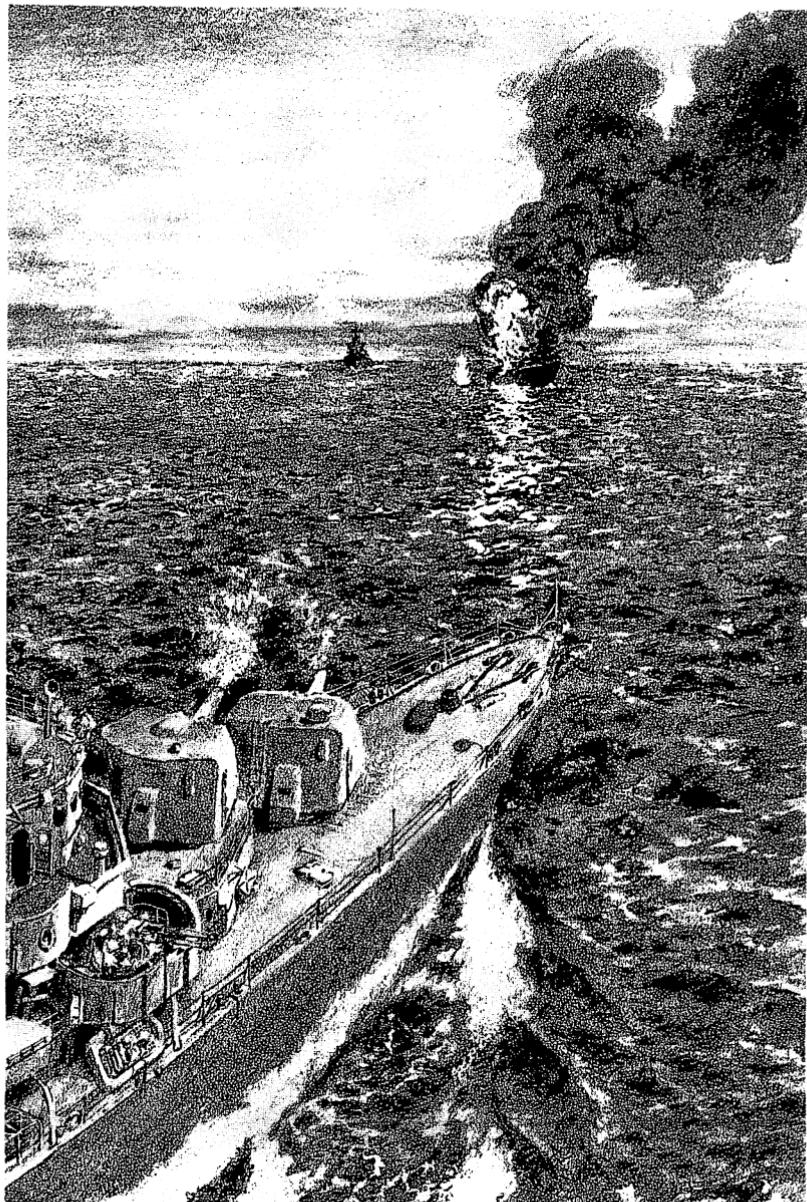
Historical Commentary

When the state of war between Great Britain and Germany came into existence at 11 AM September 3, 1939, the German Navy possessed only 57 submarines. Of these, 30 were older Type II boats incapable of operating beyond the North Sea and nearby British coastal waters. The navy commanders had accepted Hitler's assessment that war would not come until the late 1940's. Therefore a sufficient number of submarines for a naval blockade of Britain was not yet built. The Z-Plan for building the navy, revised after the outbreak of hostilities, called for the construction of 29 submarines each month. Actual production fell far short of this goal throughout the war. During the first months of the war an average of 6 or 7 longer-ranged boats were on station in the eastern North Atlantic. Despite these small numbers and Hitler's interference in their operations, the U-boats quickly reestablished the lethal reputation earned in World War I. Submarine *U-30* sank the passenger liner *Athenia* in the evening of the war's first day.

The Royal Navy thought itself ready for another U-boat war, but was in fact as unprepared as the Germans. Between the wars it had developed *asdic*, an underwater sound device for detecting submarines (known as *sonar* to the Americans). Their faith in this device was so complete that they sharply reduced the number of small ships available for convoy escort duty, and nearly scrapped all plans for a convoy system. When war broke out, the limitations of asdic became apparent and crash programs were instituted to build escort ships. Until new ships could be added, however, the number of escorts available was severely limited. Convoys sailing west would split up 100 miles west of Ireland and the ships proceeded as independents. Eastbound convoys met their escorts at the 100 mile limit to be taken to port. Especially slow or fast ships were kept out of convoys and sailed everywhere as independents. The fast ships were thought reasonably safe on their own and needlessly hindered by the convoy system. The slow ships were thought to hold back the rest of a convoy. The British were also slow to provide the air patrols that later forced U-boats away from the richer coastal hunting grounds and into the central Atlantic where aircraft couldn't reach. Due to poor planning and overconfidence, the Germans were given a great opportunity. The British avoided disaster only because so few U-boats were available.

By the time France fell in June, 1940, U-boats had succeeded in sinking 224 ships of approximately 1.3 million tons at the cost of 27 submarines lost. The majority of these sinkings were unescorted

ships sailing as independents. The Royal Navy gradually put all ships into convoys, but this improvement was overwhelmed by advantages the Germans gained from the capture of French air and naval bases. From French ports the transit distance to the sea lanes decreased by 1000 miles. This increased both the time U-boats could spend actively hunting, and the distance into the Atlantic they could search. In addition, long range bombers threatened convoys within 2000 miles of France and additional bases captured in Norway.

The period of July 1940 to March 1941 was recalled by the Germans as the "happy time," due to the large number of sinkings they scored relative to their own losses. During 1940, when they managed only an average of 21 boats at sea, they sank 492 ships of 2.4 million tons for the loss of 26 boats. It was in this period they assembled enough boats to carry out their first *wolfpack* attacks.

Hindered by the lack of escorts, the Royal Navy received vital aid from the United States in late 1940. As part of the "destroyers for bases" agreement between Churchill and Roosevelt, 50 old World War I destroyers were transferred to the British. In April of 1941 the US assumed responsibility for protecting all shipping in the Western Hemisphere west of 26 degrees West Longitude. This freed escorts for the British side of the Atlantic. Germans and Americans began firing at one another from the start, but, to Churchill's chagrin, both sides avoided drawing the United States into an outright declaration of war. Newly-built escort ships appeared and aircraft began demonstrating their ability to sink submarines. In March of 1941 U-boat sinkings began to climb and the loss of three famous U-boat aces that month signaled the end of the happy time.

January through July of 1942 was a second "happy time" for the Germans, although the US was now officially in the war. The Americans unwisely refused to implement a convoy system along the Atlantic coast and the Germans quickly profited from this opportunity. Beginning with five "ace" boats that sank 20 ships of 150,000 tons in two weeks, the Germans reinforced their presence in the "golden west." At the peak of the campaign, during May of 1942, U-boat high commander, Admiral Donitz, concentrated 30 boats between Halifax and Trinidad. The US Navy took until August 1942 to implement an interlocking convoy system between Cuba and Nova Scotia. By this time the Germans had sunk 360 ships of 2.3 million tons for the loss of 8 boats. This was the most successful U-boat campaign of the war.

The implementation of convoys on the American seaboard eliminated the easy kills. Coupled with the expense of operating so far from their bases, this caused the U-boats to almost entirely return to the North Atlantic. By August of 1942 the German Navy possessed over 300 U-boats. During the last half of the year they perfected their wolfpack tactics and were winning most of the convoy battles. They estimated they needed to sink 700,000 tons of shipping per month in 1942 to strangle Britain. During the last three months of the year they sank an average of 650,000 tons. However, they had underestimated American industrial might which built 20 million tons of new shipping in 1943, alone, double the German estimate of Allied capability.

Of more immediate importance than underestimated Allied shipbuilding were technological advances in anti-submarine warfare. Airborne radar was developed to intercept U-boats in transit in the Bay of Biscay (off the French coast). Ship-borne radar made it difficult to approach a convoy on the surface undetected. During daylight, aircraft based on escort carriers and longer-ranged patrol aircraft harassed submarines on the surface near convoys. If forced to submerge, a sub fell behind the convoy and was unable to attack at all. Escort ships were available in sufficient quantities. Convoys were now accompanied by powerful groups of up to eight well equipped escorts, sometimes including escort carriers.

U-boat losses began to mount beginning in March of 1943. Although that month they enjoyed some real success with their wolfpack tactics, they only managed to sink 105 ships of 590,000 tons for the loss of 16 boats. In April
Allied losses dropped in half while 15 more U-boats were lost. In May of 1943 the Germans were forced to admit defeat in the U-boat war. At the cost of 42 boats, only 44 ships of 225,000 tons were sunk. Admiral Donitz withdrew all but a token force of U-boats from the Atlantic.

The defeat of the U-boats in 1943 assured the survival of Britain and the build up of necessary material for the invasion of France in 1944. The U-boats continued to put to sea, tying down the large Allied resources deployed to keep the sea lanes open. Meanwhile the Germans worked on technological developments of their own to regain the advantage in the convoy battles. They made remarkable advances such as the "schnorkel" that allowed existing boat types to remain essentially submerged while recharging their batteries. However,enough improved U-boats were never available to have an appreciable effect on the rest of the war.

German losses for the convoy battles were 785 U-boats sunk and 28,000 crewmen dead. The British Merchant Marine lost 2,800 ships of 14 million tons and 30,000 sailors. Many of the Royal Navy's war losses of 51,000 men were U-boat victims. American losses were much less than British, for both the merchant marine and navy. Convoy escort was predominantly handled by British and Canadian forces. Of the U-boats sunk, 514 are credited to British/Canadian forces and 166 to American. Of the American kills, a large majority are attributed to aircraft. Over half of all U-boats sunk were lost to aircraft.

Destroyer Escort and U-Boat Technology

U-Boat Equipment

Type VII Boat: Of the 900 U-boats that saw action during World War II, over 75% were Type VII boats. This type was 220 feet long, 21 feet wide, and displaced 769 tons. Its maximum dive depth was 300-400 feet. It had a maximum speed of 17 knots on the surface and 8 knots submerged. Cruising at 12 knots, it had a range of about 6500 miles. The Type VII mounted 1-3 anti-aircraft guns and had 5 torpedo tubes. It normally carried a crew of 44 men and 14 torpedoes.

Type IX Boat: The only other boat type used in any quantity was the long range Type IX used to patrol distant areas. It was 237 feet long and 23 feet wide. Its displacement was 1,144 tons. Its speed was similar to the Type VII boat, but its range was 11,400 miles. The Type IX mounted 1-3 anti-aircraft guns and contained 6 torpedo tubes. It carried 19 torpedoes and a crew of 48.

Diesel/Electric Power: While on the surface the U-boat was powered by diesel engines. When submerged the sub was powered by electric batteries. The amount of time a sub could remain underwater was limited by its electric power. World War II submarines spent almost all of their time on the surface, diving only when in danger.

Torpedoes: Until late 1943 the Germans used only two torpedo types: the oxygen propelled *G7A* and the electric *G7E*. The G7A travelled at up to 44 knots and had a maximum range of 18,000 meters, but left a visible wake. Despite its 30 knot speed and 6,000 meter range, the G7E was generally preferred because it left no wake. Too late to have a major impact, the Germans deployed acoustic and "zig-zag" torpedoes. The acoustic model homed in on

the motor noise of a ship and were effective against the elusive escorts until a towed noise maker nullified them. The zig-zag model was a "fire and forget," slow moving, long range torpedo. Fired into the path of a convoy, it zig-zagged along its course until it hit a target.

Milch Cows: To help overcome the limitations on the fuel and torpedoes that U-boats could carry, supply subs called *milch cows* rendezvoused with boats on patrol to refuel and rearm them. However, resupply at sea in the North Atlantic was often made impossible by bad weather.

Schnorkel: The development of radar on ships and aircraft made submarines vulnerable even at night or in bad weather. To avoid radar detection, subs had to submerge and use their slower electric engines. The schnorkel was a device that allowed most of the sub to remain submerged but still run on diesel power. The schnorkel provided fresh air for the engines and crew, but was small enough to be nearly invisible to radar. Its development made sub patrols in coastal waters feasible again, but came too late to have substantial impact on the war.

Pillenwerfer: The *pill* was a chemical pellet released into the sea behind a U-boat. The pill chemically reacted with the water to create a cloud of gas bubbles that reflected the sonar pulse. Its purpose was to confuse or deceive the sonar operator with a false signal. Expert sonar men soon learned to distinguish contact with a pill. A normal contact with a moving boat reflected sound including a "doppler effect" from which an operator could tell whether the contact was moving away or coming closer. A pill had no doppler effect and was recognized as a deception.

Destroyer Escort Equipment:

Depth Charge: This underwater bomb was a large explosive packed in a case and primed to explode at a certain pressure. As the charge sank the pressure of the surrounding water increased until the explosion was triggered. The explosion depth was adjusted before the charge was dropped. Charges were either rolled off the back of the ship or fired to the ship's side by special launchers. If the charge exploded close enough to its target, the shock wave from the blast cracked the sub's hull, and water pressure crushed it like an egg's shell. Near misses could start leaks, damage equipment, and break the morale of the sub's crew. Modified depth charges were also effectively dropped from aircraft.

K and Y Guns: Named for the shape of their arms, these mortar-like guns threw depth charges to the sides of the ship. In tandem with the roll off racks at the stern of a ship, they quickly covered a large area, or pattern, with depth charges.

Sonar: Called asdic by the British and developed by them after World War I, this device sent a sound signal out into the water and picked up the reflection of the signal from any underwater object in the vicinity. Sonar gave surface hunters an indication of the direction and range of underwater contacts, even those making no other noise. Sonar did not give an indication of the depth of the underwater object and lost contact with objects that were close. Sonar equipment of this era only searched a limited arc to its front and had an effective range of 2-3000 meters.

Hydrophones: This underwater listening device was used by the sonar operator to pick up returning sonar signals and listen for other underwater sounds. Hydrophone experts distinguished different ships by the sound of their screws and other underwater sounds such as launched and running torpedoes.

Radar: This searching device emitted a high frequency signal into the air and collected any reflection of the signal from aircraft, ships, and other objects. Radar was especially effective in detecting U-boats on the surface when visibility was low in bad weather or at night. In these cases, the sub was brought under fire from deck guns before it could get into range to fire torpedoes. Radar had an effective range of 20-30,000 meters. Radar search from aircraft was especially effective against U-boats travelling on the surface at night.

Huff-Duff: This was the nickname for the High Frequency Direction Finder (HF/DF). Installed on an escort ship, it detected the direction of U-boat radio signal transmissions up to 100 miles away. If more than one escort carried this device, they could triangulate their intercepts and pinpoint the exact location of the transmission.

Deck Guns: U-boats rarely gave escort ships the opportunity to fire at them with deck guns, because one shot piercing or damaging the watertight hull left the sub unable to dive. Exposed on the surface, a sub was outmatched and easily sunk. Deck guns ranged in size from 3" to 5" on escort ships and all were capable of critically damaging a U-boat. Early in the war the chance to use deck guns against subs occurred during chaotic night battles when U-boats

were making their favored surface attacks. Later in the war, deck guns were used when U-boats were spotted by radar beyond the limits of normal visibility. In some cases, depth charge attacks literally blew U-boats to the surface and deck guns were useful before the sub regained control and dived.

Hedgehogs: These small bomblets were fired in mass from a launcher over the bow of the escort. Unlike depth charges, they exploded only on contact with a sub, but had enough force to crack its hull. They were developed because of the sonar blind spot, several hundred meters directly to the escort's front. An underwater contact in that blind area was lost until the escort could again bring it into the sonar cone projecting out from ship's bow. U-boat captains, knowing of this blind spot, waited until they were in it to attempt an evasive maneuver the escort could not follow. As the escort approached the contact, the hedgehogs were fired into the blind spot to catch the sub just at the moment it normally disappeared. The hedgehog was a late war development added onto only a few ships.

Anti-Aircraft Guns: Convoys were rarely attacked by aircraft except on routes passing by Norway or the French coast. The Germans used long range FW-200 Kondor aircraft to spot convoys for the U-boats and deliver deadly low level attacks on the slow-moving merchant ships. Escorts were armed with a variety of AA guns, but among the most effective were the twin mounted 40mm Bofors guns used on many Allied warships.

Torpedoes: These weapons were not part of the normal equipment of standard convoy escort ships, but were found on older fleet destroyers assigned to convoy duty. Originally included on destroyers to be launched in mass by entire flotillas at an enemy battleship line, they were of little use on convoy duty. When used at all they were fired at derelicts to clear them from the sea lanes. When German sea raiders were loose early in the war, they did offer a threat to enemy surface ships.

Tactics

U-Boat Torpedo Attacks: Attacking on the surface at night was the preferred U-boat tactic. This approach gave the sub several advantages:
1. The small silhouette of the conning tower made the sub difficult to spot. The comparatively huge merchant ships and escorts were easier to see, especially if the moon was out or a ship was already on fire. U-boats were instructed to attack from the windward to

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reduce the bow wave and to force convoy lookouts to face into the spray and any rain.

2. The U-boat's surface speed was much faster than the average merchant ship's speed, and even surpassed that of many escort ship types. This speed advantage allowed subs to develop their attacks, withdraw, and move around in front of the convoy for another attack with reloaded tubes.

3. Submerged attacks at night were seriously handicapped by poor visibility through the periscope. From the open conning tower, a U-boat captain had the best possible visibility for directing his movements and aiming torpedoes.

4. A surfaced sub was not detectable by sonar. Until radar was placed on escorts, U-boats attacking on the surface had to be spotted by lookouts.

An attacking sub had to first penetrate the escort screen to reach torpedo firing range. Using its speed and visibility advantages, the U-boat stalked the front and sides of the convoy looking for an opening in the screen. Early in the war convoys rarely had sufficient escort ships to keep the screen intact. When a screen opening was found, the sub raced towards the convoy and fired a spread of torpedoes at the merchant ship columns. This fan of torpedoes offered the best chance of scoring one or more hits, possibly on more than one target. If not immediately attacked and forced to dive, the sub withdrew on the surface reloading its tubes. When reloaded, the attack could be repeated.

U-Boat Searches: In the vast area of the North Atlantic, even the largest convoy was difficult to find. The intelligence service of the German Navy was generally able to provide accurate information on the size and departure time of convoys, but convoys at sea had to be found by the U-boats themselves. To improve the chance of spotting convoys, the Germans deployed a picket line of boats across the path of an approaching convoy. The boats were positioned approximately ten miles apart and maintained radio silence to keep their presence hidden. The first boat to spot the convoy surfaced and signaled the convoy location and course to the other boats of the picket line. The first boat shadowed the convoy while the wolfpack gathered for the attack.

Wolfpack Attack: To maximize the effectiveness of an attack on a convoy, the Germans employed *Die Rudeltaktik*, a submarine pack attack. The attack began the first night that at least three of the wolfpack's picket line boats were in contact with the convoy. Acting independently, the U-boats approached on the surface and

fired their spreads of torpedoes into the convoy columns. Attacked simultaneously from several positions, the usually understrength escorts were hard pressed to keep their screen intact. Night after night the process repeated itself as more of the picket boats made contact and went into attack. The wolfpack attack broke off when the boats exhausted their torpedoes or the convoy came under daylight air cover that forced the subs below the surface. Submerged boats could not match the convoy's speed or follow its course changes, and lost contact.

The advantage of the wolfpack was that the boats cooperated together for both searching and attacking. Acting collectively they systematically searched a large area. The attacks of several boats at once, or continuous attacks one after the other through the night, confused and exhausted the escorts.

U-Boat Evasion Tactics: A hunted U-boat was in danger of being sunk at any moment, but possessed a number of advantages and tricks it could use.

The sonar of the day was not precise and its accuracy depended on the skill of the operator and water conditions. U-boat captains were aware of the sonar blind spot and made radical turns when the hunter was blind to avoid an accurate depth bombing.Sonar did not give the sub's depth, and until a scuttled U-boat that failed to sink was captured, the Allies underestimated how deep the boats could go. Since depth charges had to explode nearby to damage a sub, U-boats were safe near maximum dive depth until the Allies learned of their error.

U-boats turned faster than escorts and used this advantage to keep the escort from passing over to drop depth charges. A turn at the right moment left the hunter turning in the wrong direction and lengthened the distance between the two. Once out of the sonar search of the escort, the sub raced to distance itself before the hunter reoriented itself and its sonar. As the sub separated itself from the escort, the ability of sonar to find him lessened.

A sub could try to hide by rigging for *silent running*. In this exercise the sub shut down all but essential machinery and strictly muffled all other sounds. The hydrophone operator on the ship heard nothing that revealed the presence and location of the boat. Unless the sonar could make contact, the sub appeared to have vanished or escaped. If the ruse could be maintained long enough, the escort gave up and returned to the convoy. A desperate U-boat might

release some oil and then go silent, hoping the hunter above accepted the oil as evidence that the silent boat was sunk.

A major disadvantage of the U-boat was that the time it could stay submerged was limited. After an hour or so, the oxygen on board and the batteries were exhausted. If the escort above had the skill to maintain contact and patience to stay that long, the sub had no option but to surface. On the surface the sub was no match for an escort ship and doomed unless it got off a lucky torpedo shot.

Convoys: Escorted convoys concentrated naval forces at the point where enemy raiders had to attack. Experience proved that convoys maximized the safety of merchant shipping and were the most effective way of allocating warships to hunt subs.

The typical North Atlantic convoy consisted of 45 to 60 ships arranged in columns, the more valuable ships towards the center. One ship at the rear of the convoy was appointed rescue ship and charged to pick up the crews of stricken ships. The remainder of the convoy was under orders not to stop. The merchant ships were under the command of a convoy commodore.

Convoy Escorts: A wide variety of ships served in the role of escorting convoys including corvettes, destroyer escorts, US Coast Guard cutters, and second line destroyers dating back to World War I. Each convoy was assigned an escort group consisting of several ships. By 1943 these groups averaged eight ships, but were much smaller earlier in the war. Within each group there was a variety of ship types as well. The bulk of the escorts normally were the smaller corvette and escort types, with a few older fleet destroyers useful for their speed.

Tactical command of the convoy was the responsibility of the escort commander. He had to assess the strengths and weaknesses of each ship in his escort group and assign them roles based on their abilities. Ships with the best radar and sonar capability were placed to maximize their ability. Slower and less capable ships were given less important positions.

The escorts were arranged in an arc around the front and sides of the convoy so that their sonar search areas overlapped to prevent a submerged sub passing through the screen undetected. Attacks by subs on the surface at night were difficult to detect until radar was installed on all escorts.

Escort Tactics: A convoy's first warning of impending attack was often a nearby HF/DF intercept indicating a U-boat transmitting the convoy's location. If the signal was close enough, an escort was sent to harass the U-boat while the convoy made a course change. More likely, the first evidence of attack was the flare of a distress rocket fired by a torpedoed ship, the sound of an explosion, or the shout from a lookout spotting a torpedo wake. The nearest escort to an attacking sub fired illuminating rockets from the convoy to silhouette the sub's conning tower. This forced the sub to dive and prevented it from escaping on the surface with its high speed. The escort began a sonar hunt for the sub, possibly with the assistance of another ship. Even if the U-boat was not sunk, it often was shaken up badly or forced to fall so far behind the convoy that it couldn't make another attack that night. The escort commander had to continually balance the value of a continuing sub hunt versus the hole left in the screen by the absent hunting ship.

As the war continued, convoy escorts became more numerous and individually more capable. With more escorts available for the screen, the escort commander could afford to detail one or more ships for a hunt. The ships were not as desperately needed back in the screen so they could linger over a contact. Instead of settling for just shaking up a sub and forcing it to fall behind, the escort went for the kill.

Two Escort Attack: Experience showed that two ships acting together were efficient sub hunters. The value of two ships mainly related to the sonar blind spot that existed directly to the front of the sonar sensor. Working together, one ship would stand off tracking the sub with sonar while the second ship conducted a depth charge attack. The listening ship was often able to keep track of the U-boat's movements when the attacking ship was temporarily blind. The attacking ship was directed where to turn to deliver its attack.

PART III: NOTES AND CREDITS
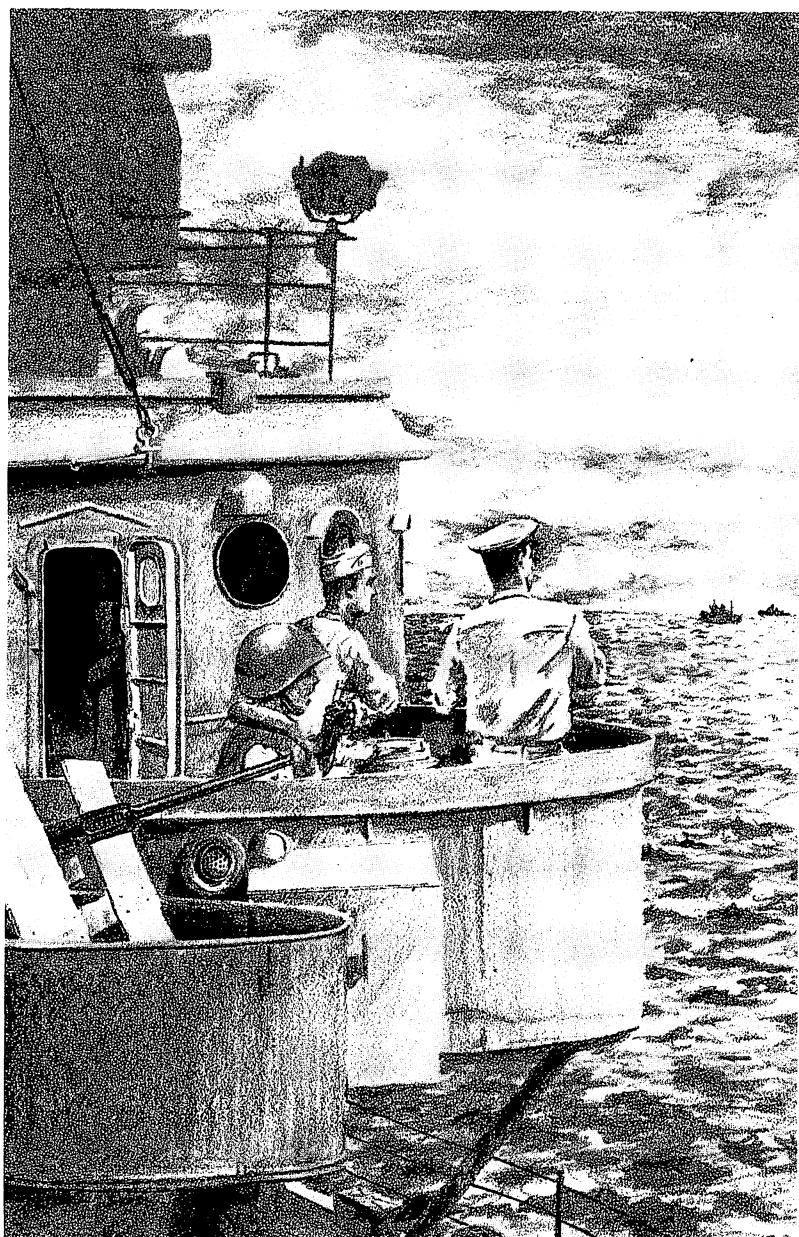
Player Notes

To be a successful DESTROYER ESCORT captain you must become skilled in all facets of convoy escort duty, not just depth charge attacks or anti-aircraft fire. The following comments are based on the experience of the playtesters of DESTROYER ESCORT. Beginning players may find them helpful in learning how best to react to game situations.

Submarine Attacks: The most common attack against your convoy is by submarine. A sub begins its attack on the surface but does not fire torpedoes until within 2500 yards of a target. A successful defense used by a playtester is to note the bearing of the attacking sub from the message window. Then go to the map station to change the course of the convoy to head directly away from the sub. Next go to the navigation station to identify the sub and reduce ship speed to 1/3 ahead. Now go to the aft 5" gun and engage the sub at long range hoping to sink or disable it before it can close to torpedo range. If the sub dives before you can stop it, you must turn toward it and attack with depth charges.

5" Gun Fire: If neither you nor your target are moving, and the range and bearing of your gun and the target match, your shells have a high probability of hitting. However, most of the time you and your target are both underway. It's almost impossible to adjust both the range and bearing of your gun to that of the enemy. Either steer directly away from him or right at him to minimize the bearing changes. This frees you to concentrate on adjusting the range of your gun. Knowing how much to fire "under" if the range is decreasing, or "over" if the range is increasing takes practice. The longer the range to the target and the faster the range is changing, the greater the allowance you must make.

Depth Charge Attacks: It is difficult to safely approach a sub to deliver a depth charge attack. As you head for it, the sub fires torpedoes that can be tricky to avoid and your evasive maneuvers can spoil your attack run. However, a sub normally fires its torpedoes right at you. If you steer a little off the direct bearing to him, his torpedoes should miss. A sub does not fire a second torpedo until the first hits a target or expires. Since a torpedo travels about 2500 yards before expiring, you can safely close the range while a torpedo that missed travels onward. When you get close and know he won't fire again soon, turn for him. Keep your ship heading right for the sub, using the keyboard controls if necessary. Drop your depth charges as the target range drops to 100 yards and less. Set

at least half of your charges to deep fuses.

Air Attacks: When an air attack begins, bring your AA gun down one notch from maximum elevation and fire at the distant planes. Traverse your gun to the left and right hosing down their formation with fire. With luck you can shoot down several before they begin diving on you. Once they begin diving keep from wasting shots and firing off all of your ammo. When a diving plane is hit the horizon flashes red.A plane that takes several hits can't fire at you, although it only counts for half points. Defending against air attacks is one of the most challenging parts of DESTROYER ESCORT and requires much practice.

Torpedo Tactics: Torpedoes are difficult to use successfully. Beginners should reserve them to "finish off" crippled enemy ships and subs. Torpedoes can only be fired from the sides of your ship. Their range is merely 2500 yards, and they travel that distance slowly. One useful technique is to put your ship on a course exactly perpendicular to an approaching enemy. This is called "crossing the T." As you cross his heading, launch your torpedoes. Time your arrival so that the enemy is inside 2500 yards or approaching that range when you fire. If he maintains his course he runs onto the torpedoes as they reach the end of their run. In the meantime you can turn away to swing around on the opposite heading and prepare to launch again after the previous salvo either reaches its limit or hits.

Firing Torpedoes: If you fire your torpedoes from an exactly perpendicular course as the enemy approaches you do not need to lead the target. In all other firing positions you must aim your torpedoes slightly in front of the target, estimating his position when the torpedo reaches his vicinity. It takes practice to become skilled in leading targets. Regardless of skill, launch an entire "spread" of three torpedoes, shifting the lead slightly for each one.

Destroyer/Convoy Positioning: Don't stray too far from your convoy when chasing down a sub or ship contact. When a new attack occurs, the enemy is placed relative to your position, not the convoy's. It is possible then for the enemy to appear right on top of your convoy and too far away for you to intercede before some of your convoy ships are lost. Therefore, keep within a thousand yards of the convoy.

Resupply at Sea: It is easiest to make the resupply rendezvous if the supply ship is steaming on a vertical or horizontal heading

such as 000 or 090 degrees. Take the time to maneuver your destroyer carefully because there is a high risk of collision if you get within 50 yards or less of any ship.

Practicing Against Attacks: As explained in the Bridge Station section (page 10), you can automatically generate an attack of your choice against the convoy. Thus it's possible to get playing quickly, or to concentrate on practicing one type of situation. For example, to practice against air attacks, boot up the game. When the teletype appears, press the *Teletype Default* key to go right into the game. This puts you at the bridge station. Immediately generate an air attack by pressing the *Air Attack* key. These automatic attacks can be made into a mini-game of their own. For example, generate air attack after air attack until you are eventually overwhelmed and sunk. But keep track each time you do this to see how long you last and how many planes you can shoot down or damage.

Further Reading

During the development of DESTROYER ESCORT many books and periodicals were consulted for information about destroyer escorts and their history. In addition to historical works, novels were also looked at to help define the role of the game player. Of the sources consulted, the following were most helpful and are recommended reading if you wish to learn more about the World War II convoy battles in the Atlantic.

Historical Works:

THE ATLANTIC CAMPAIGN by Dan van der Vat, Harper & Row Publishers, New York, 1988. The most recent history of the campaign including especially good coverage of the Axis side and the impact of Enigma intelligence.

THE BATTLE OF THE ATLANTIC by Terry Hughes and John Costello, Dial, New York, 1977. An excellent history of the campaign that is liberally illustrated.

CONVOY by Martin Middlebrook, Morrow, New York, 1976. An excellent examination of the last big wolfpack success by one of the best World War II military historians.

UNITED STATES DESTROYERS OF WORLD WAR II by John C. Reilly Jr., Blandford, Poole, 1983. Very detailed technical information on the development of US destroyers during the war.

UNITED STATES DESTROYER OPERATIONS IN WORLD WAR II by Theodore Roscoe, Annapolis, United States Naval Institiute, 1953. A classic history of destroyer operations including many detailed accounts, illustrations, and battle maps.

Novels:

THE CRUEL SEA by Nicholas Monsarrat, Knopf, New York, 1985. An excellent novel, first published in 1951, describing the life of an escort ship crew during the Battle of the Atlantic. The author participated in the campaign.

THE GOOD SHEPHERD by C. S. Forester, Little Brown, New York, 1955. The story of a convoy battle as experienced by the escort commander. Written by a master of the sea novel.

Credits

Original Software Development (C-64):
Frank Covitz, Imagineering Inc.

Original Game Design:
Robert Prescott, Imagineering, Inc.

Original Version Computer Graphics:
Jesse Kapili and Mike Sullivan, Imagineering Inc.

Original Version Sound Effects:
Alex Demeo, Imaginering Inc.

Original Project Managers:
Garry and Dan Kitchen, Imagineering Inc.
Bruce Shelley, MPS Labs

Manual Text:
Bruce Shelley, MPS Labs

Print Media Director:
Iris Leigh Idokogi,MPS Labs

Manual Graphics:
Graphics by Iris Leigh Idokogi
and Barbara Bents, MPS Labs
Illustrations by Michael Reis
Layout by Jackie Ross, MPS Labs

Packaging Design:
Mark Ciola, MicroProse Software,Inc.
John Emory, MicroProse Software,Inc.

Original Version Quality Assurance:
Russ Cooney, MPS Labs

Original Version Playtesting:
Russ Cooney, Robert Prescott, Bruce Shelley

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